



Recycling Materials Survey

AASHTO SOM
Burlington, VT

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DeIDOT

Topics/Agenda

- ◆ Recycled Materials Survey
 - RAP, RAS, RCA
- ◆ Results
- ◆ Survey Points of Interest
- ◆ Moving Forward

“The greatest gap in life is the one between knowing and doing.”

Dick Biggs

Recycled Materials Survey

- ◆ Conducted through AASHTO SOM List Serve.
- ◆ Sent end of December 2010.
- ◆ Various questions related to RAP, RAS, RCA.
- ◆ 45 state responses plus West Federal Lands and Ontario.
- ◆ Some data used is from 2007/2008 survey due to lack of responses.

Survey (cont)

◆ Main Survey Questions

- Allowance of recycled materials (RAP, RAS, RCA) per specifications?
- Contractors actual usage of recycled materials?
- Special testing/handling procedures?
- Research needs, major concerns/obstacles for increased usage of recycled materials?

RAP Survey

- ◆ Items of note from survey...
 - **RAP Availability** – contractor/DOT ownership?
 - **WMA** - Increased usage during DOT implementation?
 - **Stockpiles** - Fractionation, captive stockpiles becoming more prevalent?

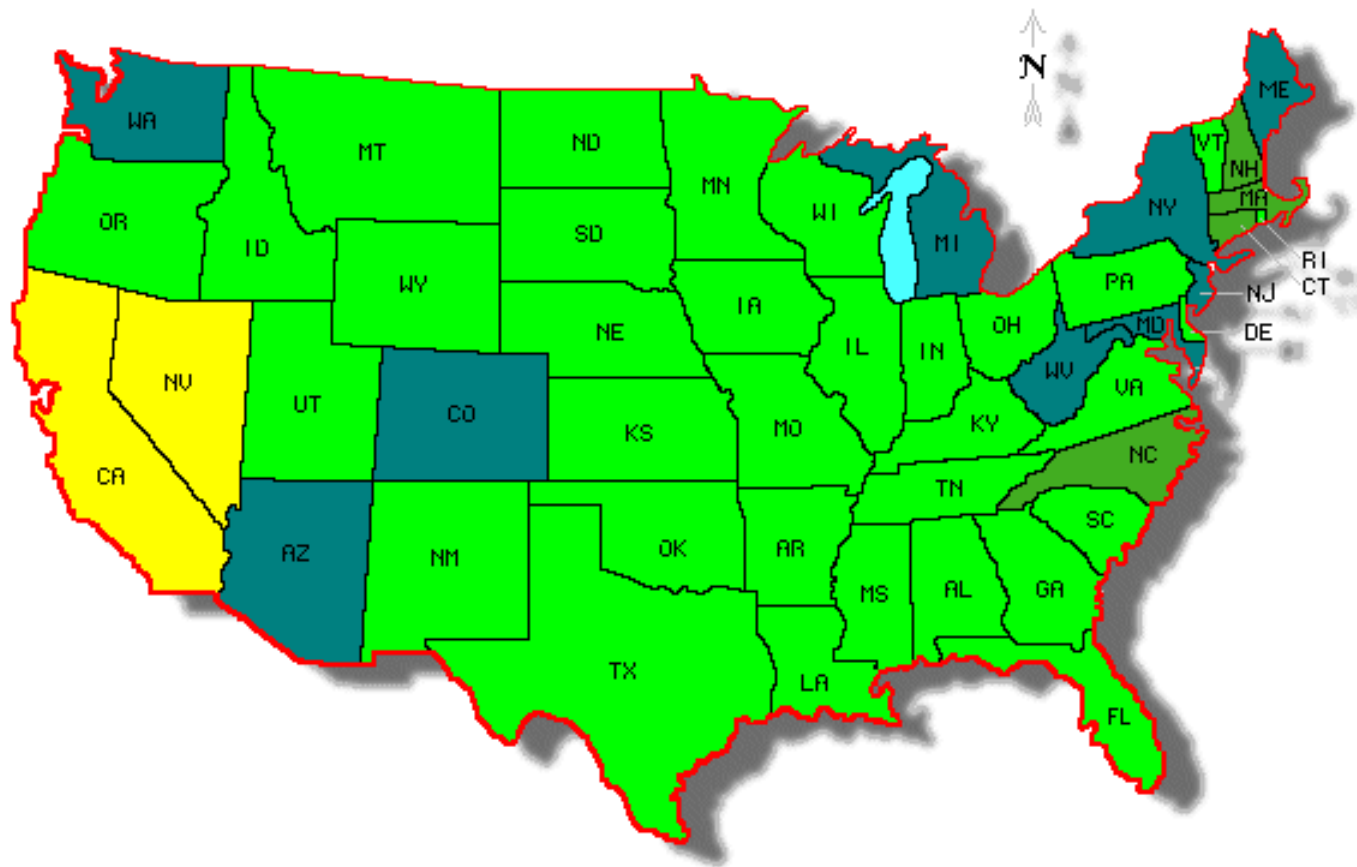
RAP Survey (cont)

◆ Research Needs:

- Needed dwell time for mixing?
- Mix performance tests (long-term durability, thermal cracking, f/t resistance).
- Binders - bumping, blending, stiffness/cracking, interaction with polymers.
- Determining RAP binder properties.
- Skid resistance.

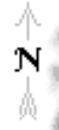
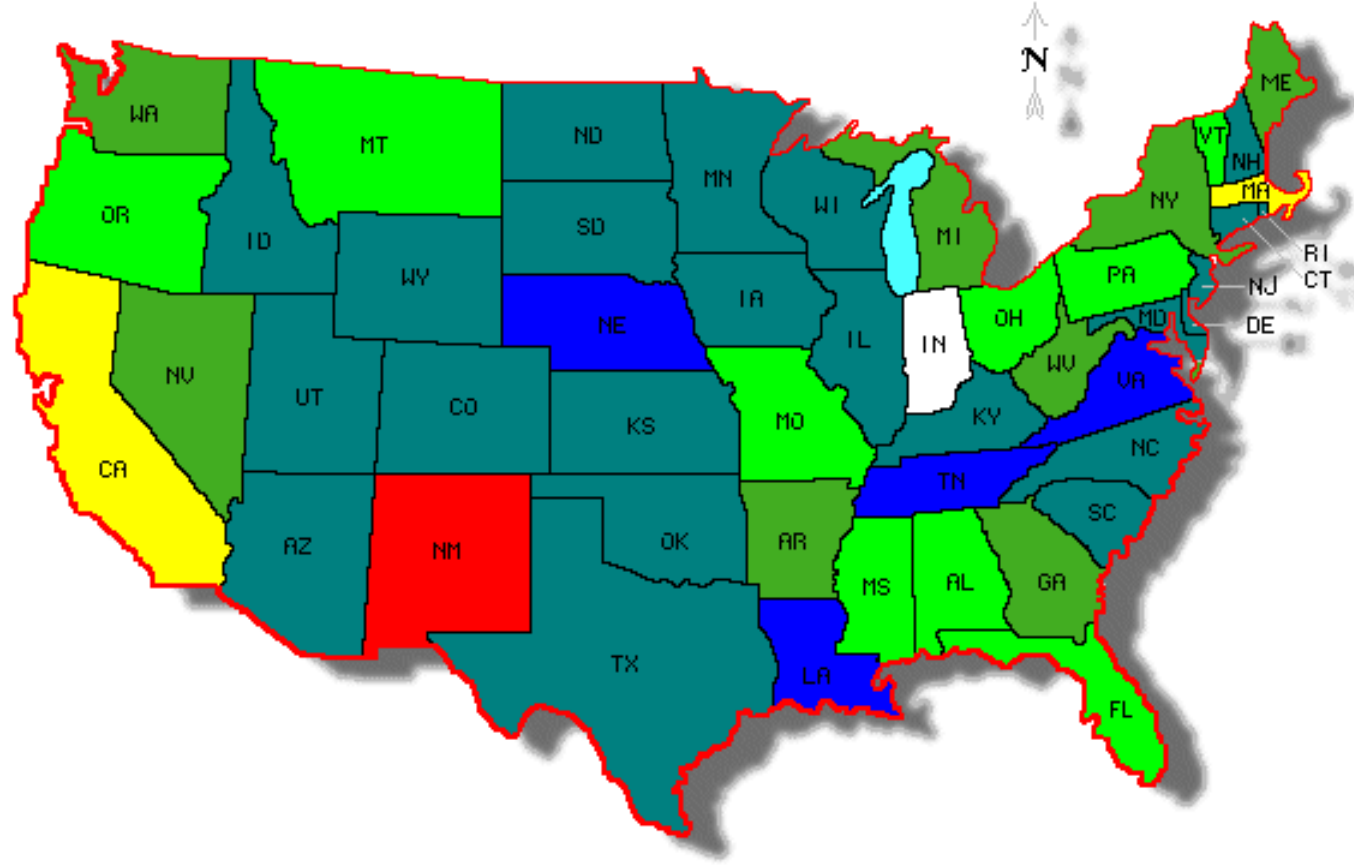
Allowable RAP Usage

- - <15%
- - <20%
- - <25%
- - >30%



RAP Usage (Contractors)

- - 0%
- - <10%
- - <15%
- - <20%
- - <25%
- - >30%



Since 2007/2008 Survey...

- ◆ RAP % *allowed* by percentage has stayed pretty consistent for DOT's.
- ◆ For RAP *utilization* by contractors, it appears the 20-30% usage has increased the most with all other percentages staying pretty much the same.

RAS Survey

- ◆ Items of note from survey...
 - **Sources** – pre/post consumer supply (about 50/50).
 - **Special Requirements** – gradations, asbestos testing.

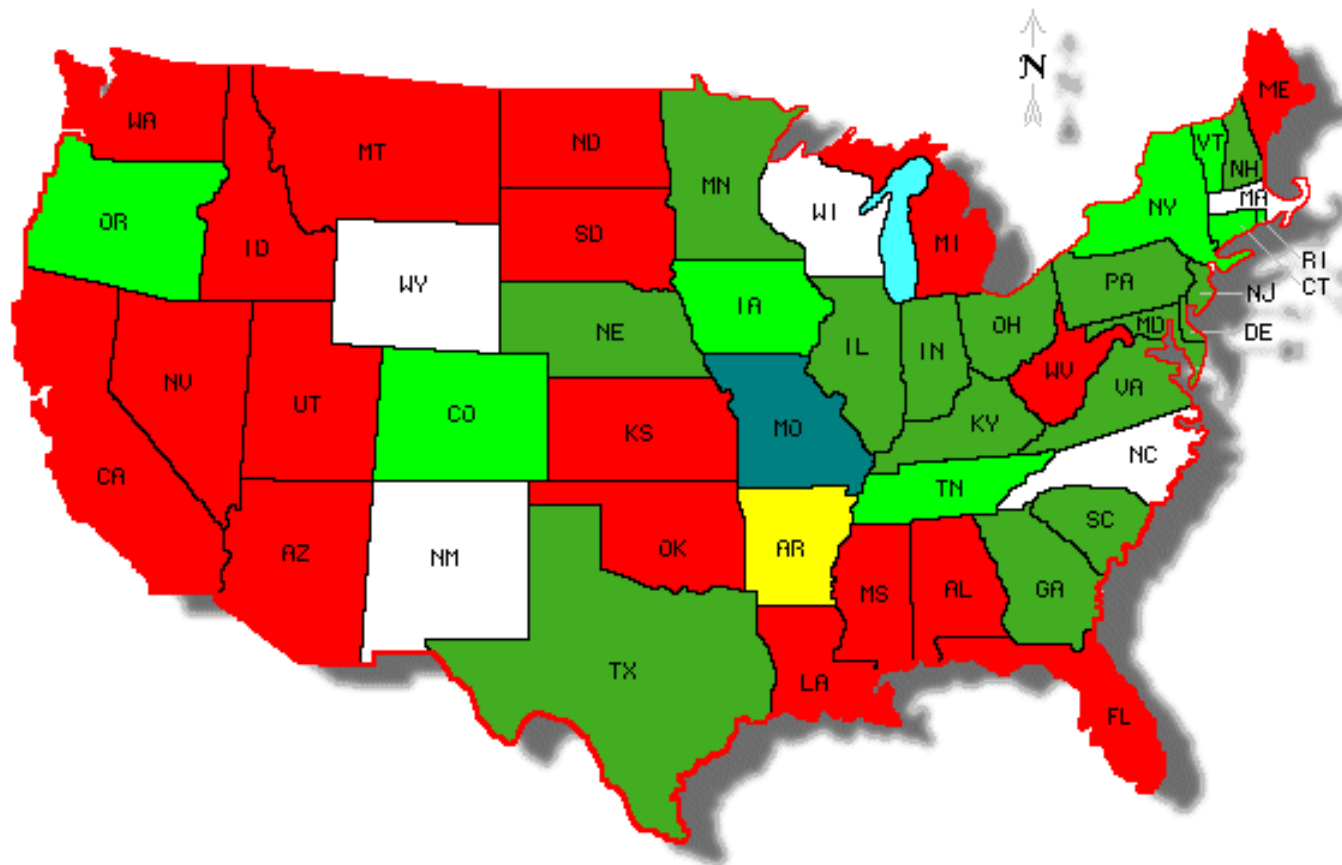
RAS Survey (cont)

◆ Research Needs

- % binder contribution
- Mix performance testing
- Binder bumping, blending
- Fatigue and low temperature cracking
- Use in WMA?
- Use of rejuvenators
- Binder impacts

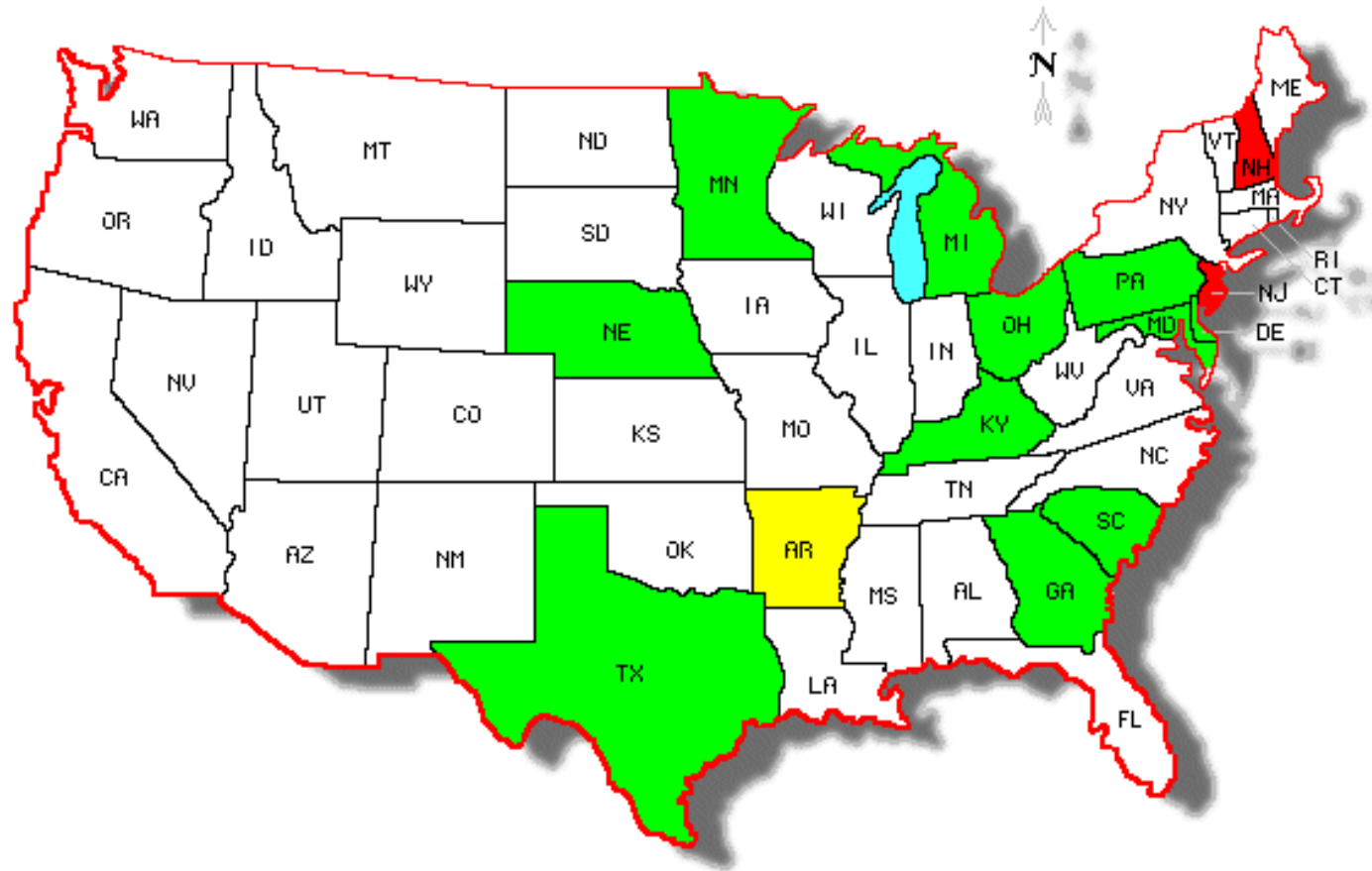
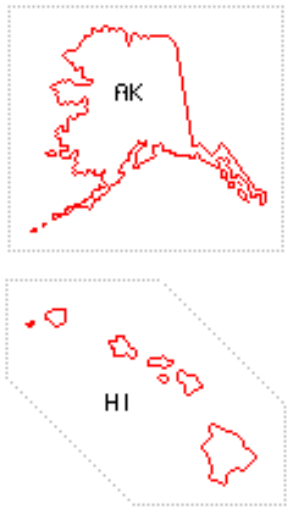
Allowable RAS Usage

- - 0%
- - 3%
- - 5%
- - 7%
- - Looking Into



RAS Usage (Contractors)

- - 0%
- - 3%
- - 5%



RCA Survey

- ◆ 80% of states responding allow use of RCA in some form.
- ◆ Uses – mostly as recycled aggregate base or fill; some use in new PCC, LCB, HMA.
- ◆ Concerns/Obstacles – stockpile contamination/management, durability, unknown sources of aggregates, ASR, leaching, pH levels.

RCA Survey (cont)

◆ Research Needs

- Durability of PCC w/RCA
- Use of unknown RCA w/r/t ASR & D-cracking
- Clogging of underdrains from RCA fines
- Sample specifications
- Leaching, pH

Moving Forward

- ◆ Market successful projects.
- ◆ Address research needs.
- ◆ All must work together – DOT's, contractors, industry, academia.

“If we’re here to make a difference – and why else are we here – we have to do things that have never been done before. To many people that’s a risk. To me it’s an adventure.”

Gwen Edwards



Thank you for your time and attention

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